VNIVERSITAT DE VALÈNCIA

Course Guide
36136 Mathematics for dynamic models

COURSE DATA

DATA SUBJECT

Code: 36136
Name: Mathematics for dynamic models
Cycle: Undergraduate Studies
ECTS Credits: 6
Academic year: 2026-27

STUDY (S)

Degree	Center	Acad. year	Period
1316 - Degree in Economics	Facultat d'Economia	4	First quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
1316 - Degree in Economics	Pathway: economic analysis	ELECTIVES

COORDINATION

BOLOS LACAVE VICENTE

SUMMARY

"Mathematics for Dynamic Models" is a semester-long elective taught in the fourth year of the Degree in Economics.

This subject introduces basic concepts related to discrete dynamics, continuous dynamics, and stochastic dynamics, illustrated with examples of well-known economic models. These concepts are necessary for modeling dynamic problems of all kinds. In addition, the basic concepts and techniques for solving difference equations and ordinary differential equations are developed.

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

There are no specified enrollment restrictions with other subjects of the curriculum.

OTHER REQUIREMENTS

Prior knowledge corresponding to the following subjects are assumed:

- Mathematics I: Basic analytical concepts related to the differential and integral calculus.

- Mathematics II: Modelling of problems.

COMPETENCES / LEARNING OUTCOMES

1316 - Degree in Economics

Apply the principles of economic analysis (rational decision) to the diagnosis and resolution of problems.

Be able to learn autonomously.

Have decision-making skills and be able to apply knowledge to practice.

Have oral and written communication skills in the native language.

Understand and apply the scientific method, which involves formulating hypotheses, deducing verifiable results and contrasting them with empirical and experimental evidence.

DESCRIPTION OF CONTENTS

1. Discrete Dynamics: Difference Equations.
Difference equations (DEs), solution of a DE, initial value problem, autonomous first-order DEs, equilibrium point stability theory, linear DEs.

2. Continuum Dynamics: Ordinary Differential Equations.
Ordinary differential equations (ODEs), solution of an ODE, initial value problem, discretization, solution methods, linear ODEs.

3. Stochastic Dynamics.
Discrete stochastic difference equations, stochastic differential equations.

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Theory	30,00
Computer classroom practice	30,00
Total hours	**60,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	15,00
Independent study and work	25,00

Preparation of lessons	35,00
Preparation for assessment activities	15,00
Resolution of case studies	0,00
Total hours	**90,00**

TEACHING METHODOLOGY

- Lectures:

The teacher will highlight the main aspects and those that are most difficult to understand, explain examples and guide the students through the available materials in the virtual classroom and the reference manuals. At the end of the lecture, the teacher will point out the materials needed for the next lecture, so the students can prepare it

- Practical classes:

The teacher will solve exercises and propose others that the student must solve either on the board or in the next class.

EVALUATION

The student must submit some exercises designed by the teacher throughout the course, which will be evaluated together on 4 points. At the end of the semester, a written exam of 6 points will be made. The final grade will result from the sum of the notes of the exercises and the written exam.

On second call, a written exam of 6 points will be made, keeping the note of the exercises. However, the student can renounce the note of the exercises and so, the written exam will be of 10 points.

In subsequent calls, a written exam of 10 points will be made.

REFERENCES

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